Associations between Perceived Social Support, Post-Traumatic Stress Disorder (PTSD), and Complex PTSD (CPTSD): implications for treatment

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Data Availability

NCMH welcome proposals for collaboration. Further information on the study can be obtained at www.ncmh.info/

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We have no conflicts of interest to disclose.

Abstract

Background: Perceived Social Support (PSS) is one of the most important risk factors for the onset and maintenance of post-traumatic stress disorder (PTSD) symptoms, however the relationship between PSS and Complex PTSD (CPTSD), is unknown. The evidence-base for CPTSD treatment is currently lacking, though increasingly important given the recent publication of the ICD-11, which now allows for a formal diagnosis of CPTSD.

Objective: This research aims to develop understanding of the relationship between PSS and CPTSD with a view to informing the development of new and existing treatments.

Method: A cross-sectional study was undertaken with 246 individuals recruited to the National Centre for Mental Health (NCMH) cohort. Measures of PSS and PTSD/CPTSD were undertaken with this clinical sample and linear and logistic regression were conducted to assess for associations between PSS and the PTSD symptom clusters of DSM-5 and ICD-11, and to explore the predictive utility of any PSS association on the likelihood of a CPTSD presentation.

Results: It was found that individuals with a presentation of CPTSD tend to exhibit lower levels of PSS, compared with individuals not presenting with CPTSD, and lower PSS had a statistically significant unique association with the likelihood of presenting with CPTSD.

Conclusions: Intervention aiming to improve PSS could be particularly helpful for some individuals with CPTSD, especially those with disturbances in relationships, and there is opportunity to develop skills training within a phase-based approach to treatment that targets factors related to PSS.

Keywords

Post-Traumatic Stress Disorder; PTSD; Complex Post-Traumatic Stress Disorder; CPTSD; Perceived Social Support; Stress Disorders, Post-Traumatic; Social Support

Introduction

The recently published eleventh edition of the International Classification of Diseases ICD-11 (WHO, 2018), allows for the diagnosis of a new condition, complex post-traumatic stress disorder (CPTSD), in addition to post-traumatic stress disorder (PTSD). Exposure to an extreme traumatic event, re-experiencing, avoidance and hyperarousal are core features of both the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (APA, 2013), and ICD-11 PTSD. The criteria for DSM-5 PTSD also include symptoms associated with more complex presentations such as exaggerated negative beliefs and expectations, distorted cognitions manifesting in self-blame, and feelings of detachment or estrangement from others (Karatzias et al., 2016, Friedman, 2013). In contrast, the presence of 'disturbances in self-organisation' (DSO), in the form of affective dysregulation, negative self-concept, and disturbances in relationships, in addition to the symptoms of PTSD results in an ICD-11 diagnosis of CPTSD as opposed to PTSD. These DSO symptoms contribute to the conceptualisation of CPTSD as a clinical disorder characterising trauma impact on an individual's emotion regulation, identity and interpersonal domains, compared with PTSD, which is conceptualised as a fear-based disorder (Hyland et al., 2017, Bisson, 2013).

It is widely accepted that poor perceived social support is one of the most important risk factors for the onset and maintenance of PTSD symptoms (Ozer et al., 2003, Brewin et al., 2000, Holeva et al., 2001, Robinaugh et al., 2011, Ehlers and Clark, 2000), though the association between social support and CPTSD is not yet known. Social support is multi-dimensional, with a distinction made in the literature between the actual support an individual receives, and their perceived availability of support. Though the relationship between the two constructs is contested in the literature, perceived social support has been shown to be more closely related to an individual's ability to adjust and cope with stress, compared with ratings of received social support (Norris and Kaniasty, 1996). Explanatory models for the widely recognised association between social support and PTSD symptoms include: 'social causation' models, such as the stress-buffering hypothesis (Cohen and Wills, 1985), based on the assumption that lack of social support may precede and contribute to increases in psychological distress following trauma; 'social erosion' models, where an individual's social support resource is thought to decline due to psychological distress following trauma (Kaniasty and Norris, 2008); and attachment theory, whereby social cognition, developed in infancy, mediates the relationship between trauma and PTSD symptoms (Bryant, 2016, Woodhouse et al., 2015). It is already known that treatments that help develop skills likely to be associated with improved ability to access social support are beneficial to those with more complex presentations of PTSD (Cloitre et al., 2002). Further insight in to the associations between social support and different profiles of PTSD and CPTSD may have important implications for the development of more effective treatments.

Given the nature of the more 'complex' post-traumatic stress symptoms, such as exaggerated negative beliefs and expectations, and feelings of detachment or estrangement from others, it seems plausible that social support/perceived social support would play a role in, and therefore be closely associated with these symptoms, to a greater extent than with the 'core' symptoms of PTSD, with respect to both DSM-5 and ICD-11 classification systems. Indeed, an association between CPTSD and higher levels of functional impairment, particularly family and relationship problems, has already been shown (Karatzias et al., 2018). This study therefore aimed to investigate the association between perceived social support (PSS) and presentations of PTSD, and for the first time to our knowledge, the association between PSS and CPTSD. We hypothesised there would be lower levels of PSS reported for a CPTSD group compared with a non-CPTSD group. Unlike ICD-11, which

allows for a distinct CPTSD diagnosis, DSM-5 does not, however the expansion of PTSD diagnostic criteria in the fifth edition of DSM has resulted in the inclusion of some symptoms that overlap with those of CPTSD (Powers et al., 2017, Friedman, 2013). Therefore, we also set out to examine the relationship between DSM-5 and ICD-11 PTSD symptom clusters and PSS, hypothesising a greater association between PSS and the DSO symptom clusters, compared with the 'core' PTSD symptom clusters. Being an exploratory cross-sectional study, we were able to consider these symptom clusters of DSM-5 and ICD-11 as independent variables, with PSS being the dependent variable, but also to examine PSS as an independent variable, along with certain demographic variables, and whether it was uniquely associated with the likelihood of a CPTSD diagnosis.

Methods

Participants

This study was cross-sectional in its design, with participants recruited to the Welsh Government-funded National Centre for Mental Health (NCMH) cohort, via primary and secondary mental health services, and social and other media, including adverts across the third sector. Participants were aged 16 or older, reporting either that they had previously been given a diagnosis of PTSD, or they reported that they had been exposed to a traumatic event and then screened positively for PTSD based on the Trauma Screening Questionnaire (Brewin et al., 2002). Individuals were excluded if they were unable to read and write in English or were recently admitted to hospital or intensive home treatment due to a disturbed mental state. All individuals reported exposure to a traumatic event fulfilling the requirements for a diagnosis of PTSD and CPTSD under DSM-5 and ICD-11. The NCMH cohort study has been granted ethical approval by Wales Research Ethics Committee 2.

Data from 246 individuals was available for the measures of interest, the Clinician Administered PTSD Scale for DSM-5 (CAPS-5) (Weathers, 2013) and the Multidimensional Scale for Perceived Social Support (MSPSS) (Zimet et al., 1988), and data was also available from a proportion of these individuals (n=187) for another main measure of interest, the International Trauma Questionnaire ITQ (Hyland et al., 2017, Cloitre et al., 2018). The dataset with 246 individuals consisted of an equal number of males and females, with 123 males (50.0%), aged between 16 and 75 years (M=47.37, SD=12.57), predominantly White in ethnicity (n=235; 95.5%). Most participants were unemployed (n=171; 69.5%), roughly half had higher education attainment (n=143; 58.1%), with a similar number of individuals married or cohabiting (n=119; 48.4%), as were single, widowed, divorced or separated. *At the time of assessment*, 158 (64.2%), of the 246 individuals met a PTSD diagnosis according to DSM-5 on the basis of CAPS-5 assessment. Of the 187 individuals who also completed the ICD-11 ITQ, 94 (50.3%) met ICD-11 CPTSD diagnosis, 29 (15.51%) met ICD-11 diagnostic criteria for PTSD, and 112 (59.9%) met a PTSD diagnosis according to DSM-5.

Measures

The MSPSS is a widely used 12-item self-report measure, shown to be reliable (α=.86), and valid in a variety of populations (Canty - Mitchell and Zimet, 2000, Bruwer et al., 2008, Zimet et al., 1988). The measure is not anchored to a timeframe and considers current perception of social support, using a 7-point Likert scale, anchored by 'Very strongly disagree' (1) to 'Very strongly agree' (7), to measure the subjective assessment of adequacy of social support from family, friends, and partners.

To assess lifetime exposure to traumatic events, a modified version of the Life Events Checklist for DSM-5 (LEC-5), was used (Weathers, 2013). The modification was to include two additional items assessing exposure to childhood physical abuse and childhood sexual abuse or molestation.

The CAPS-5 was used to assess PTSD. The CAPS-5 is widely used in clinical, research and forensic settings and is recognised as a benchmark criterion measure of PTSD, with strong test-retest reliability ($_K$= .83), high internal consistency (α=.88), and good convergent validity with other measures (Weathers et al., 2018). CAPS-5 has a standardised symptom severity scoring system, combining frequency and intensity information in to a single 5-point (0-4), severity scale, with anchor points: 0 (absent); 1 (mild/subthreshold); 2 (moderate/threshold); 3 (severe/markedly elevated); and 4 (extreme/incapacitating). Symptom cluster severity scores are sums of the individual item severity scores per cluster, with Criterion B (re-experiencing) being a sum of the severity scores for five items, Criterion C (avoidance) being a sum of two items, Criterion D (negative alterations in cognitions and mood) being a sum of seven items, and Criterion E (hyperarousal) being a sum of six items. A symptom is considered present if the corresponding item severity score is rated ≥2, with additional items requiring a trauma-relatedness rating of 'definite' or 'probable'. DSM-5 requires the presence of at least one Criterion B symptom, one Criterion C symptom, two Criterion D symptoms, and two Criterion E symptoms. With the additional requirement of presence of Criterion F and G, disturbance of at least one month, and disturbance causing significant distress or functional impairment, respectively.

The ITQ, is a self-report measure of the ICD-11 diagnoses of PTSD and CPTSD (Cloitre et al., 2018). Respondents rate how much they have been bothered by the individual symptoms, and are instructed to answer the DSO items in relation to how they typically feel, think about themselves, and relate to others. Responses are rated using a five-point Likert scale, anchored by 'Not at all' (0) to 'Extremely' (4). PTSD diagnostic criteria requires a score of ≥2 ('Moderately'), for at least one of two symptoms from the 'core' clusters: re-experiencing of the traumatic event in the here and now (Re); avoidance of traumatic reminders (Av), and a persistent sense of current threat (Th). CPTSD diagnosis requires PTSD criteria are met and endorsement of a moderate level of severity for one of each of the DSO symptom cluster, defined as summed score that equals a score of ≥2 for each of the items in the clusters: a summed total score of ≥10 for five items reflecting hyperactivation, or a summed total score of ≥8 for four items reflecting hypoactivation (AD); a summed total score ≥8 for four items reflecting negative self-concept (NSC); and a summed total score ≥6 for three items reflecting disturbances in relationships (DR). There is also a requirement for the presence of functional impairment associated with both sets of symptoms for a diagnosis of PTSD and CPTSD. The ITQ has been validated in several studies and has strong psychometric properties (α=.87) (Hyland et al., 2017, Karatzias et al., 2016, Cloitre et al., 2018).

Analysis

Analyses were performed using the Statistical Package for Social Science, SPSS (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.). Means and standard deviations were calculated for continuous variables and frequencies (%) for categorical variables. To explore group differences on the PSS, an independent-samples t-test was conducted. To explore whether total score on the PSS was related to DSM-5 PTSD symptom clusters, ICD-11 PTSD symptom clusters, gender, age, higher education, current employment, and living arrangements, two separate multiple linear regression analyses were conducted, the first with DSM-5 PTSD symptom clusters, the second with ICD-11 PTSD symptom clusters. To explore the unique associations of PSS, gender, age, living arrangements, level of education, and employment, with the likelihood of a CPTSD presentation, direct logistic regression was performed, the dependent variable being a diagnosis of ICD-11 CPTSD, the reference group being no diagnosis of ICD-11 CPTSD. Further multiple regression

analyses were undertaken as post-hoc analyses, to further explore an unexpected finding relating to an ICD-11 PTSD AD 'affective dysregulation' symptom cluster.

Results

Table 1 presents demographic characteristics of the sample.

An independent-samples t-test was conducted to compare PSS score in the CPTSD and not CPTSD groups. The CPTSD group (M=3.83, SD=1.44) reported significantly lower levels of PSS than the not CPTSD group (M=4.50, SD=1.50); t(188)=3.12, p<0.001, one-tailed. The mean total MSPSS score for all participants was 4.16 (SD=1.50).

To test if DSM-5 PTSD symptom clusters were associated with PSS, multiple linear regression was conducted with the following variables: DSM-5 PTSD criterion B; DSM-5 PTSD criterion C; DSM-5 PTSD criterion D; DSM-5 PTSD criterion E; gender; age; level of education; status of employment; and marital status. The results indicated that these variables explained 19.5% of the variance in the model (R^2=19.5, F(9, 236)=6.348, p<0.001). Table 2 presents a summary of the findings and shows that the presence of the DSM-5 PTSD D criteria significantly correlated with a lower level of PSS, (β=-0.181, p<0.05). Being married or cohabiting significantly correlated with a higher level of PSS (β=0.253, p<0.001), and being employed was found to significantly correlate with a higher level of PSS (β=0.132, p<0.05).

To test if ICD-11 PTSD symptom clusters associated with PSS, a separate multiple linear regression analysis was performed, with the following variables: ICD-11 PTSD Re; ICD-11 PTSD Av; ICD-11 PTSD Th; ICD-11 PTSD AD; ICD-11 PTSD NSC; ICD-11 PTSD DR; gender; age; level of education; status of employment; and marital status. The results indicated these variables explained 19.4% of the variance of this model (R^2=19.4, F(11,175)=3.832, p<0.001). Table 3 presents a summary of the findings, showing that the presence of ICD11 DR was found to significantly correlate with a lower level of PSS (β=-0.257, p<0.01). Interestingly, presence of ICD11 AD was found to significantly correlated with a higher level of PSS (β=0.189, p<0.05). Being married, or cohabiting was found to significantly correlate with a higher level of PSS (β=0.227, p<0.005).

To test the impact of several factors on the likelihood that individuals would present with a diagnosis of CPTSD (N=94), as compared to ICD11 PTSD (N=93), direct logistic regression was performed. The model contained six independent variables (PSS, gender, age, level of education, status of employment and marital status). This model was found to be statistically significant, χ^2 (6, N = 187) = 14.89, p<0.05, indicating that the model was able to distinguish between respondents who presented with CPTSD and those who presented with PTSD. The model as a whole explained between 7.7% (Cox & Snell R^2) and 10.2% (Nagalkerke R^2) of the variance in presentation of PTSD/CPTSD, and correctly classified 58.8% of cases. As shown in table 4, PSS made a unique statistically significant contribution to the model, therefore suggesting it to be significantly related to a diagnosis of CPTSD (OR = 0.78, p<0.05).

Post-hoc analyses were conducted to offer an explanation to the surprising finding that higher levels of PSS significantly correlated with the presence of the ICD11 'affective dysregulation' AD cluster. The ITQ AD cluster consists of two elements: hyper-activation "when I am upset, it takes me a long time to calm down"; and a hypo-activation "I feel numb or emotionally shut down". We hypothesised that PSS would be more closely associated with hypo-activation than with hyper-activation and set out to examine if this was the case. Two multiple linear regression analyses were

performed. The first examined PSS with the ITQ AD hyper-activation, plus the following variables: ITQ Re; ITQ Av; ITQ Th; ITQ NSC; ITQ DR; gender; age; level of education; status of employment; and marital status. The second examined PSS with the ITQ AD hypo-activation, plus the following variables: ITQ Re; ITQ Av; ITQ Th; ITQ NSC; ITQ DR; gender; age; level of education; status of employment; and marital status. The results of the first analysis indicated the variables explained 23.3% of the variance of the model (R^2=23.3, F(11,175)=4.824, p<0.001), and as predicted, presence of the ITQ AD hyper-activation was found to significantly correlate with a higher level of PSS (β=0.291, p<0.001). The results of the second analysis indicated the variables explained 17.6% of the variance of the model (R^2=17.6, F(11,175)=3.39, p<0.001), and as predicted, the presence of the ITQ AD hypo-activation was associated with a lower level of PSS, though not to statistical significance (p=0.505).

Discussion

The findings of this exploratory study suggest individuals with a presentation of CPTSD tend to exhibit lower levels of PSS, compared with individuals not presenting with CPTSD. Furthermore, though the odds ratio was found to be fairly small, lower PSS was significantly associated with the likelihood of presenting with CPTSD as compared to PTSD (OR=0.78, p<0.05).

We hypothesised a role for PSS in the presentation of the "complex" symptom clusters. We found partial support for this given our findings that lower levels of perceived social support significantly associated with the presence of the 'negative alterations of cognitions and mood' symptom cluster, Criterion D, within DSM-5 PTSD. The picture that emerged for ICD-11 PTSD 'disturbances in self-organisation' symptom clusters was less straightforward. Individuals with lower levels of perceived social support were more likely to report the presence of the 'disturbances in relationships' symptom cluster, to a statistically significant level, and they were also more likely to report the presence of the 'negative self-concept' cluster, though the latter was not statistically significant. Contrary to our hypothesis, *higher* levels of perceived social support significantly associated with the presence of the 'affective dysregulation' cluster. As expected, individuals with lower levels of perceived social support were also less likely to be married, or cohabiting, and were less likely to be employed, though these factors, along with gender, age, and level of education, were not found to be uniquely associated with presentations of CPTSD.

The finding of significant associations between PSS and the 'disturbances in self-organisation' (DSO) ICD-11 CPTSD symptom clusters, compared with non-significant associations between PSS and ICD-11 PTSD symptom clusters, suggests PSS may be particularly important in the presentation of CPTSD compared with PTSD. The finding contributes to literature which conceptualises CPTSD as a disorder characterising trauma impact on an individual's emotion regulation, identity and interpersonal domains, being distinct from PTSD, which is conceptualised as a fear-based disorder (Hyland et al., 2017, Bisson, 2013). The finding that only one of the DSM-5 PTSD symptom clusters, Criterion D, was found to be statistically significantly associated with PSS, that cluster being the more "complex" of the symptom clusters, is consistent with this and adds to existing literature that considers DSM-5 PTSD to be encapsulating presentations of PTSD and CPTSD within one diagnosis (Bisson, 2013). The DSM-5 PTSD B, C and E criteria, like the closely related ICD-11 PTSD clusters, were not associated with PSS, providing further support for an association of reduced PSS and greater complexity. Previous research has found PSS to correlate robustly with PTSD symptoms (Ozer et al., 2003, Brewin et al., 2000). The consideration of PTSD as a whole in these studies, using earlier DSM and ICD

classification systems may, however, have masked different degrees of association with separate symptom clusters.

The mean total MSPSS score for all participants of 4.16 (SD=1.50), in the present study was lower than MSPSS scores reported in other studies, including those of PTSD sufferers. Schnaider et al (2017) reported a mean total MSPSS of 4.9 (SD= 1.2) in individuals pre-treatment for PTSD. Osman et al (2014) reported mean MSPSS scores from several studies, ranging from one study with undergraduate student participants with a mean score of 5.80 (SD=0.86), to another study with psychiatric outpatients with schizophrenia and mood disorders with a mean score of 5.00 (SD=1.60). The mean total MSPSS score for the PTSD group in our study was 4.50 (SD= 1.50) with the CPTSD group scoring substantially lower, at 3.83 (SD=1.46), suggesting that CPTSD may be associated with particularly low levels of PSS.

Though we cannot determine the direction of association between lower PSS and CPTSD, due to the cross-sectional nature of the study, various explanatory models may help to explain the findings of the current study. Firstly, the importance of social cognition and social bonds in response to traumatic events is widely recognised, drawing on the importance of attachment styles and systems, with increasing evidence that attachment plays an important role in the development and maintenance of PTSD (Woodhouse et al., 2015, Bryant, 2016). The lower levels of PSS found in individuals presenting with CPTSD in the present study may be partly explained by the attachment styles of these individuals through their response to trauma and the world around them. Additional models that might help to explain the present findings include the 'social causation' models, such as the stress-buffering hypothesis (Cohen and Wills, 1985), theories positing the hinderance of negative post-trauma cognitions through greater social support (Ehlers and Clark, 2000). 'Social erosion' models also offer explanation; interpersonal difficulties may increase due to CPTSD symptoms, thereby having a deleterious effect on social resource and resulting in low levels of PSS (Kaniasty and Norris, 2008, Woodhouse et al., 2015, Bryant, 2016).

We found limited literature on the topic of PSS in relation to presentations of PTSD *compared with* CPTSD, however we might make inferences from recent research which has focused attention on other factors and their relationship with CPTSD, factors that might be expected to be related to PSS. For example, Karatzias et al (2018) demonstrated significant associations between negative trauma-related cognitions about the self, attachment anxiety, and expressive suppression, and CPTSD. Also, literature reports CPTSD associating with higher levels of functional impairment, particularly family and relationship problems (Karatzias et al., 2017). The present study's finding, that low PSS appears to be characteristic of the CPTSD group, might be explained by this literature. Indeed, if we were to take the factor of negative self-concept, such symptoms are defined in terms of persistent beliefs about oneself as diminished, defeated, or worthless and are accompanied by deep and pervasive feelings of shame, guilt or failure (Cloitre et al., 2013). Such symptoms may be a consequence of, contributing and/or maintaining factors in one's perception of social support.

The finding that *higher* levels of perceived social support were significantly related to the presence of the 'affective dysregulation' (AD) cluster is more difficult to explain, though findings of post-hoc analyses did shed some light. The ITQ AD cluster hypo-activation item, "I feel numb or emotionally shut down", was found to be associated with lower levels of PSS, as we would expect, however the hyper-activation item, "when I am upset, it takes me a long time to calm down", was associated with higher levels of PSS, resulting in the cluster *overall* being associated with higher levels of PSS. There are several possible explanations for the association of AD hyper-activation with higher levels of perceived social support. These include the possibility that our findings are due to chance. Different levels of PSS may be causing or resulting from the possible presence of different sub-types within

the CPTSD diagnosis. The AD hyper-activation may be a less specific or accurate symptom of CPTSD than other DSO symptoms. Finally, the ITQ questions may be eliciting a different phenomenon than CPTSD AD hyper-activation. Further research will be required to explore this.

Strengths and limitations of the study

Our findings must be interpreted in the context of strengths and limitations of our work. The MSPSS is a brief measure, and is self-reported, though it has been shown to be reliable and valid in a variety of populations (Canty - Mitchell and Zimet, 2000, Bruwer et al., 2008). A widely used measure, it captures an overall rating of PSS, scored from three sub-scale sources: family, friends and significant other. Perceived social support was of interest in the present research and PSS has been shown to be more closely related to an individual's ability to adjust and cope with stress, compared with ratings of actual, or received social support (Norris and Kaniasty, 1996). Furthermore, there is debate in the literature regarding the usefulness of ratings of actual, or received support, not least due to arguments concerning the subjective nature and accuracy of its measurement, and although significant, perceived social support has been shown to be only weakly correlated with objective/independent ratings of actual, or received support. For example an average correlation of $r=.35$, $p<.001$ was found in a meta-analysis of 23 studies (Haber et al., 2007). This weak correlation implies perception of social support might be determined not only through the appraisal of received social support but also due to other factors, for example negative self-concept. Our understanding in the area of social support would be aided by future research that considers perceived social support with respect to objective measures of received or actual social support and other potential moderators.

The present study considered the overall total MSPSS score, which has been found to be a useful measure of overall functioning and wellbeing (Haber et al., 2007). We did not set out to examine the unique relationships of the various domains of social support captured by the MSPSS, with CPTSD, namely support from friends, family, and a close other, which may be considered a limitation. Findings of research considering these separate domains and PTSD have shown support from family and friends to be negatively correlated with post-trauma cognitions, and positively associated with PTSD, though social support from a close other was not associated with post-trauma cognitions (Woodward et al., 2015).

The sample of this cross-sectional study was moderate in size and reasonably typical of a more complex PTSD clinical sample, though the vast majority of individuals were White in ethnicity, therefore it is important to be cautious with respect to the generalisability of the study findings. That said, the demographic characteristics are broadly comparable (see table 1), across the groups, which is a strength in terms of controlling for demographic influences on PSS. There were roughly twice as many individuals not employed, as opposed to employed, at the time of assessment, though this is reasonably typical for a PTSD population and has been reported recently elsewhere (Karatzias et al., 2017).

Another potential limitation of the present study is multiple testing and the fact that we did not strictly control for the increase in familywise error rate of 0.05 across the statistical analyses. We considered using Bonferroni adjustments but decided against this due to the limitations associated with their use (Nakagawa, 2004, Perneger, 1998),and tried to keep our overall number of analyses reasonably small. Given the cross-sectional nature of this study, we were unable to determine the direction of causality of low levels of PSS. In other words, our findings cannot tell us whether lower levels of perceived social support are preceding and contributing to, or are a consequence of, psychological distress and PTSD/CPTSD symptomatology.

Clinical and research implications

A statistically significant association was found between PSS and likelihood of presenting with CPTSD, albeit with a small odds ratio (OR = 0.78, $p<0.05$), and further research is now urgently required to further explore the association of PSS with PTSD and CPTSD and to develop new, more personalised treatment approaches informed by this work. Potential fruitful avenues for future research include the relationship of PSS to time since trauma and type of trauma. In Ozer et al's (2003), meta-analysis, the strongest association between PSS and posttraumatic stress symptoms was when the time since trauma to assessment was longer. Ozer et al also demonstrated a protective value of PSS post-trauma, particularly following combat trauma, compared with other forms of interpersonal violence. Similarly, Brewin et al (2000) found this protective element of PSS post-trauma to be strongest following combat trauma.

Our findings suggest lower levels of PSS are more likely to associate with a more complex presentation of PTSD. Further research is required, however the markedly low levels of PSS in the CPTSD group in the present study, and the strong association found between PSS and CPTSD suggest it is an important issue for clinicians to be aware of and to consider when developing prevention strategies, assessing and treating individuals with CPTSD (Bisson et al., 2009, Bisson, 2014). There are many reasons why low PSS should be addressed, not least the association of higher levels of PSS with feelings of safety, engagement with treatment and outcomes following treatment (Charuvastra and Cloitre, 2008, Shnaider et al., 2017).

Conclusions

PTSD and CPTSD presentation are heterogeneous disorders, and prevention and treatment must, therefore, be adaptive to this heterogeneity. Our results suggest that interventions aiming to improve PSS, could be particularly helpful for some CPTSD sufferers, particularly those with disturbances in relationships. It would be valuable to determine if existing effective treatments that target the development of affect regulation and interpersonal skills before trauma-focused therapy, impact on levels of PSS, for instance treatments such as Skills Training in Affective and Interpersonal Regulation plus Modified Prolonged Exposure (STAIR/MPE), an evidence-based 2-phase cognitive behavioural treatment (Cloitre et al., 2002). There is an opportunity to develop and enhance skills training by specifically targeting factors relating to PSS. For instance, skills acquisition to enhance opportunities for improved social support and cohesion. This is likely to include key elements of STAIR to help individuals better communicate their distress to/with others and improve their interpersonal skills but also introduce other components such as compassion-focused work (Karatzias, 2018). Interpersonal Psychotherapy (IPT), may also be of relevance, given its goal in mobilising patients' social supports, and IPT has been suggested to offer help to individuals with PTSD to gain confidence in their social interactions and to gather social support, and in turn feel more able to expose themselves to trauma reminders in treatment (Markowitz et al., 2015).

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Table 1: Participant demographic variables across groups

Variable	ICD-11 ITQ completers (n=187)		DSM-5 CAPS completers (n=246)
	ICD-11 Not CPTSD (n=93)	*ICD-11 CPTSD (n=94)*	
ICD-11 NoPTSD Diagnosis (%)	64 (34.22)	_	
ICD-11 PTSD Diagnosis (%)	29 (15.51)	_	
ICD-11 CPTSD Diagnosis (%)	_	94 (50.3)	
DSM-5 PTSD Diagnosis (%)	112 (59.9)		158 (64.2)
Mean age at time of assessment (SD)	48.71 (13.69)	47.58 (12.18)	47.37 (12.57)
Gender			
Male (%)	46 (49.5)	48 (51.1)	123 (50.0)
Female (%)	47 (50.5)	46 (48.9)	123 (50.0)
Ethnicity (%)			
White	91 (97.8)	89 (94.7)	235 (95.5)
Asian	1 (1.1)	0	1 (0.4)
Mixed	0	5 (5.3)	8 (3.3)
Other	1 (1.1)	0	2 (0.8)
Employment (%)			
Unemployed	54 (58.1)	68 (72.3)	171 (69.5)
Employed	39 (41.9)	26 (27.7)	75 (30.5)
Living arrangements (%)			
Married or Cohabiting	56 (60.2)	39 (41.5)	119 (48.4)
Single or Widowed or Divorced or Separated	37 (39.8)	55 (58.5)	127 (51.6)
Higher Education, A levels and above (%)			
Higher Education	56 (60.2)	53 (56.4)	143 (58.1)
No Higher Education	37 (39.8)	41 (43.6)	103 (41.9)

Note: DSM-5=fifth edition of the Diagnostic and Statistical Manual of Mental Disorders; ICD-11=eleventh edition of the International Classification of Diseases; CAPS=Clinician-Administered PTSD Scale for DSM-5; ITQ=the International Trauma Questionnaire.

Table 2: Summary of multiple linear regression analyses for DSM-5 criteria and demographics as correlates of Perceived Social Support (PSS).

Predictor	Beta	*p*-value
Gender	.074	.239
Age at time of assessment	.03	.643
Marital status	.253	.000
Level of education	.047	.439
Employment status	.132	.040
DSM-5 PTSD B criteria	-.141	.051
DSM-5 PTSD C criteria	-.05	.486
DSM-5 PTSD D criteria	-.181	.017
DSM-5 PTSD E criteria	.103	.157

Note: DSM-5=fifth edition of the Diagnostic and Statistical Manual of Mental Disorders;

Table 3: Summary of multiple linear regression analyses for ICD-11 criteria and demographics as correlates of Perceived Social Support (PSS).

Predictor	Beta	*p*-value
Gender	0.008	0.915
Age at time of assessment	-0.033	0.669
Marital status	0.227	0.003
Level of education	0.017	0.809
Employment status	0.096	0.200
ICD-11 PTSD Re criteria	0.017	0.834
ICD-11 PTSD Avoidance (Av)	-0.510	0.544
ICD-11 PTSD Th criteria	0.004	0.958
ICD-11 PTSD AD criteria	0.189	0.038
ICD-11 PTSD NSC criteria	-0.157	0.059
ICD-11 PTSD DR criteria	-0.257	0.007

Note: ICD-11=eleventh edition of the International Classification of Diseases; Re=re-experiencing of the traumatic event in the here and now; Av=avoidance of traumatic reminders; Th=a persistent sense of current threat; AD=hyperactivation/hypoactivation; NSC=negative self-concept; DR=disturbances in relationships.

Table 4: Direct logistic regression of variables associated with likelihood of reporting symptoms of CPTSD.

Variable	*p*-value	Odds Ratio	95.0% C.I. for Odds Ratio	
			Lower	Upper
Perceived Social Support (PSS)	.025	.783	.632	.970
Female Gender	.592	.842	.450	1.58
Age at time of assessment	.415	.990	.965	1.015
Higher Education	.884	.955	.510	1.786
Married / Cohabiting	.177	.642	.337	1.222
Currently employed	.189	.635	.323	1.250